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102300-13-L
9 December 1974

A SKYLAB PROGRAM FOR THE INTERNATIONAL HYDROLOGICAL DECADE (IHD)

Quarterly Report for Period June 1974 — August 1974

EREP Investigation 427M
NASA Contract NAS9-13275

Prepared by

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A SKYLAB PROGRAM FOR THE INTERNATIONAL HYDROLOGICAL DECADE (IHD)

Quarterly Report for Period June 1974 — August 1974

This report covers progress during the sixth quarter (1 June through 31 August 1974) of contract NAS9-13275, "A SKYLAB Program for the International Hydrological Decade (IHD)," EREP No. 427M. The principal objective of this program is the study of various hydrological aspects (soil moisture, water currents, etc.) of portions of the Lake Ontario basin using SKYLAB and aircraft data. The work is being conducted in the Infrared and Optics Division of the Environmental Research Institute of Michigan, under the general supervision of Mr. R. R. Legault. The principal investigator is Mr. F. C. Polcyn.

PROGRESS

During this reporting period an algorithm was developed for predicting surface soil moisture of vegetated terrain based on reflectance characteristics in the red and near IR channels. Processing of the aircraft data obtained 10 and 11 September 1973 over the Elora Farm was begun and directed toward testing this model. The data preparation aspect of the processing has been accomplished to date. This includes deskewing (data alignment), clamping (elimination of level shifts in the data), scaling (elimination of gain changes), and averaging (system noise reduction and aspect correction along the flight line).

We have received word that, in all likelihood, only four channels of the S-192 data will be corrected and made available to us. These channels, 5 ($\sim$.60 - .65 μm), 6 ($\sim$.65 - .73 μm), 7 ($\sim$.78 - .89 μm), and 13 ($\sim$10.2 - 12.5 μm) should enable us to perform the work necessary for completion of the objectives of this program, if the data is in usable condition.

Preliminary efforts to implement a model for determination of surface soil moisture on non-vegetated areas based upon diurnal soil temperatures and ancillary data have been begun.

In accordance with discussions with the technical monitor, an extension of the performance period of the contract is being requested to 30 June 1975 (contract end date of 30 September 1975).

FUTURE PLANS

Plans for the next quarter include completion of the aircraft processing. A more detailed description and preliminary analysis of the algorithm for determination of surface soil moisture of vegetated terrain will be presented in the next report. In addition, a summary discussion of the photointerpretation of Lake Ontario will be presented.

TRAVEL

During the early part of June, Mr. Tom Wagner and Dr. Bill Benjey attended the International Seminar and Exposition on Water Resources Instrumentation in Chicago. This trip was not funded under this contract but SKYLAB photography obtained on the pass over Lake Ontario was displayed. SKYLAB data products in general were discussed.

SPECIAL PROBLEMS

Lack of S-192 data severly limits performance.

SIGNIFICANT RESULTS

The development of the algorithm (using real data) relating red and IR reflectance to surface soil moisture over regions of variable vegetation cover will enable remote sensing to make direct inputs into determination of this important hydrologic parameter.

PUBLICATIONS

None

Respectfully submitted:

Fabian C. Polcyn
Principal Investigator

Approved by:

Richard R. Legault
Director - Infrared and Optics Division

FCP:RRL:dlc